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CLASSIFICATION C-O-N-F-I-D-E-N-T-I-A-L [redacted]

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

REPORT [redacted]

CD NO. 25X1

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DATE OF INFO.	[redacted]		

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THIS IS UNEVALUATED INFORMATION

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Attached is [redacted] forwarded as received. 25X1

[redacted] Comment: The following changes should be noted in the names listed below: 25X1

For	Read
Sukhum	Sukhumi
Leverenz, fnu	Hans Leverenz
Barwich, fnu	Hans Barwich
Jungclausen, fnu	Hardwin Jungclaussen.

[redacted]

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CLASSIFICATION C-O-N-F-I-D-E-N-T-I-A-L [redacted]

STATE	NAVY	NSRB	DISTRIBUTION	
ARMY	AIR	FBI		AEC

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COUNTRY USSR [redacted] REPORT [redacted]

TOPIC Atomic Energy Program at the Institute of Professor Hertz near Agudzeri

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EVALUATION [redacted] PLACE OBTAINED [redacted]

DATE OF CONTENT [redacted] 25X1

DATE OBTAINED [redacted] DATE PREPARED 3 November 1954 25X1

REFERENCES

PAGES 4 ENCLOSURES (NO. & TYPE) 25X1

REMARKS This is UNEVALUATED Information 25X1

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1. The institute headed by Professor Hertz is located near Agudzeri at the Black sea coast. The following information was collected by personal observations:

Production of Hydrogen

2. Prior to 1949, hydrogen was produced by Blitz (fnu) in the power station. To provide for the increasing requirements, a new plant with an electrical analyser was installed in 1949 and was equipped with adequate controlling and storage facilities. The plant consisted of a main building with 7 x 12 meters floor space. A metal box of about 0.4 cubic meters was placed in the center of the house and was separated from the operating equipment and laboratory facilities by a glass wall with an inspection window. The box had two glass windows in its lower part and two short discharge tubes at the back. The interior was equipped with numerous electrode plates.
The hydrogen department located in the adjacent room contained a compressor. A container of about 25 cubic meters with a floating cap was located at a short distance from the house, as was a separate bottling installation. Apparently no heavy water production was planned. 25X1

3. Similar to Blitz who had continuously to produce hydrogen, [redacted] 25X1 Two Siemens fresh-water producers served this purpose and were operated 1 to 2 days per week, producing about 500-700 liters of acetone per week which was bottled in 20-liter containers. The product was in its main part delivered to the chemical laboratory, especially to Reichmann for his tube production and to Schimohr (fnu) for the fluorine purification. 25X1

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Stabilizing of Tubes

4. [redacted] Reichmann's tubes [redacted] 25X1
[redacted] The tubes were fixed to conical bars and placed in a lathe. The metal coating was sprayed to the ends over an area about 15 mm wide and 1 mm thick. [redacted] to spray narrow stabilizing rings on the tubes. These rings resembled wedding rings in form, width and thickness. A tube of about 40-50 cm length was fitted with 5-6 such rings. For a prolonged period of time, similar experiments were made with nickel and aluminum. Except for the aluminum which had no stabilizing effect, the results seemed to be satisfactory from a mechanical point of view. Chemically, however, these copper rings appeared unsuited, they either diminished the tube surface or the heat needed for the application of the rings had a detrimental effect on the diaphragm. This assumption was confirmed by subsequent experiments. 25X1

5. At the turn of the year 1948/1949, nickel sheet mouthpieces were manufactured and were to be welded onto the tube ends leaving the tubes themselves free. The problem was solved in 4 stages:
These mouthpieces had the same wall thickness as the tubes, about 0.2 mm. They had a slightly conical shape and a lenghtwise welding seam. The tightness of the seam was tested by exposing the tube to air pressure under water. Each tube was fitted with one smooth mouthpiece at the one end and a corrugated mouthpiece at the other. The smooth mouthpiece was shorter in length than the corrugated one. The mouthpieces were made by hand, the corrugations were produced during the manufacturing process by forcing the tube in and out.
The four different types of welding were performed in a vacuum, partly in hydrogen, nitrogen or methyl alcohol. During the first three experiments the vacuum was a low one, the fourth stage was carried out in high vacuum.

a. First stage: Experiments with heating coils.
Electrician Leverenz (fnu) was ordered to perform this task. Nicrom wire coils were placed around the welding spot. Similar experiments were made with molybdenum wire. About 80 percent of the processed tubes attained brownish discolorations extending from the welding spot into the diaphragmatic field. The tubes were rendered useless by these discolorations which were caused by a chemical reaction between the heating coils and the diaphragmatic material. The discolorations were particularly marked when molybdenum was used.

b. Second stage: Resistence welding using current impulses.
[redacted] An 8-meter long row of condensers was set up for this purpose. Since the condensers were collected from different laboratories they varied in size. They were connected in series to be used as an impulse generator with a charge of 80 kV. The discharge was applied to both welding spots of a tube simultaneously. The tube momentarily glowed red-hot and then broke into numerous parts. Since the cause of the breakage could not be determined, a copper wire was tested in the place of the tube. During the discharge, the wire attained a wavelike shape. It appeared that the electric discharge had a transversal effect which the tube could not stand. 25X1

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c. Third stage: Resistence welding using high current intensity. To avoid above-mentioned difficulties, a low-voltage battery of 250 A was used. The tube remained undamaged although it glowed over its entire length. It was found that this glowing caused a change in the formula of the material which rendered the tube useless for diaphragmatic purposes.

d. Fourth stage: Welding with the help of a high frequency transmitter (Gluehsender)

Work on this method was started in March 1949 by Dr Barwich (fnu) who was assisted by student Jungclausen (fnu) and laboratory technician Gerhard Mueller.

Welding was performed by bringing a radiator of the transmitter near to the welding spot for a short period of time. These spots started to glow while the tube itself remained unaffected.

Jungclausen and Mueller continued using this method and it is, therefore, believed that it was adopted as the method of choice for the tube delivery program to Moscow.

Information on the structure of the diaphragm

6. Laboratory technician Helmut Fischer was frequently observed working at the development and production of tubes. The admixture added to the nickel oxide as bonding material was designated as tragacant or "rubber stuff". It was seen in a nickel pan and was made up of small yellowish flakes which became slimy when exposed to moisture. Dark elements contained in the material were picked out by hand. Nickel oxide is a greenish powder which was dried in vacuum tanks. It could not be determined whether the drying process took place before or after the preparation of the mixture.

After Reichmann's death, the tube production was taken over by Jermin (fnu); and the chemical building could only be entered with a special "propus". When Reichmann had achieved his first results with the tube production, he was ordered to report to Moscow.

Diffusion chambers

7. During the laying of the foundation for the Muehlpfordt laboratory in May 1949, a pair of metal boxes was observed. They were seen either standing vertically with closed cover or lying horizontally with opened cover displaying their laminar internal construction. Two short flanged tubes protruded from the cover. There were two rows of obliquely arranged lamellae at a short distance from both side walls. The angle could not be determined or if the direction of these rows varied. The space left between the rows of lamellae was occupied by a system of tubes. In the fall of 1949, it was rumored that more such boxes were to be built.

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Sheet diaphragms

8. In Blitz' power station sheet diaphragms were rolled. The roller table was about 40 cm wide and nickel sheets (mesh) of 15-20 cm width were manufactured. When the sheets were held against the light all objects behind them appeared as dim shadows only. Reichmann and Jermin were seen at this work.

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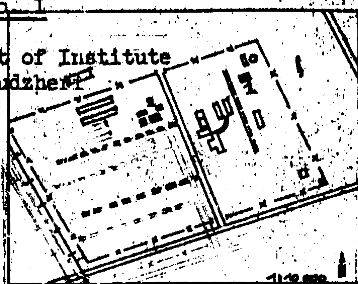
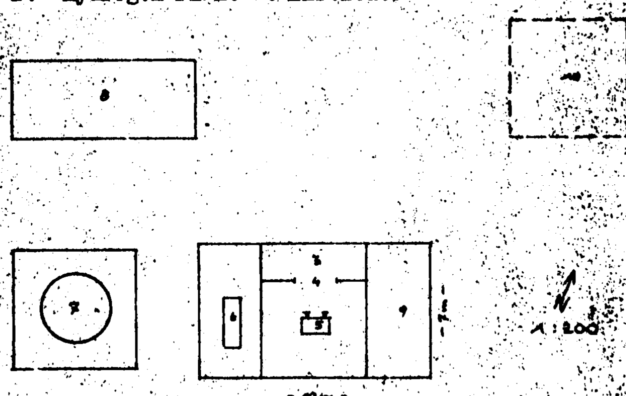
Sketch No. 1

A. Layout of Institute at Agudzheri



B. Hydrogen Plant at Institute



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A. Layout of Institute at Agudzeri

Legend:

1. Former oxygen plant (US model)
2. Stationary hydrogen-oxygen plant, erected in 1949

B. Hydrogen Plant at Institute

3. Switching station and laboratory
4. Glass wall
5. Analyzer, about 100 x 60 x 60 cm
6. Hydrogen compressor
7. Gas tank, with float cap about 25 cubic meters (diameter about 3.5 meters, height about 2.50 meters)
8. Bottling department
9. Presumably an oxygen compressor, under construction in 1949
10. Presumably an oxygen container, delivered in 1949

The analyzer (5) consisted of a metal tank, of about 1 x 0.6 base and 0.6 meters high. The lower part of the front wall had two glass windows, two short tubes protruded from the upper part of the rear wall. Numerous electrode plates were visible through the windows.

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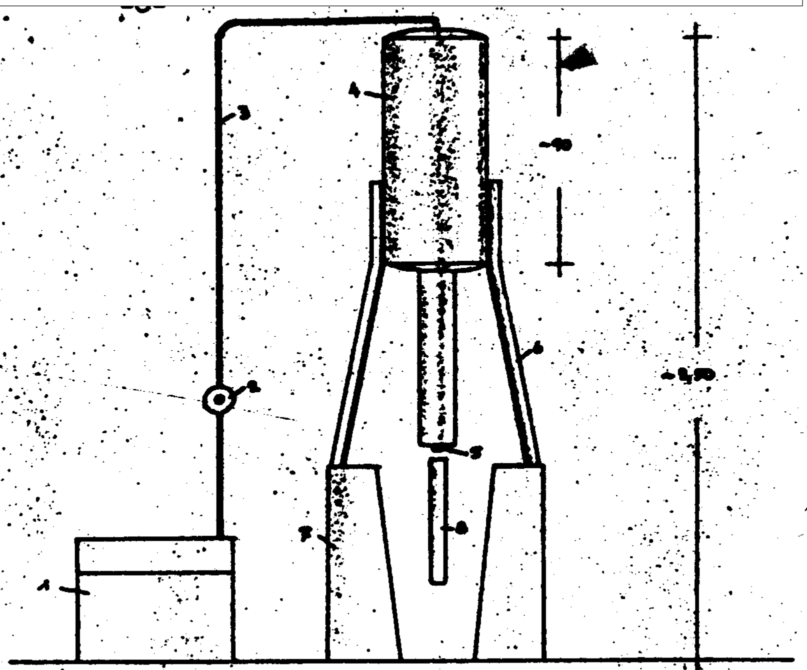

Sketch No. 2
Extrusion press for tubes

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Extrusion press for tubes

Legend:

Scale 1:20

1. hydraulic compressor
2. measuring and controlling device
3. hydraulic pressure line
4. compound tank and hydraulic gate jack
5. mouthpiece of the tube extrusion press
6. scaffolding
7. concrete foundation
8. glass receiver filled with acetone for the reception of the tubes

Procedure: The plastic tube was pressed through the mouthpiece at a rate of 1 cm p.s., received by hand in the glass container and cut flush with the container rim. Several assistants worked in line. The tube was preconsolidated by the acetone, which attained a greenish tinge and had to be purified continuously. The tubes were of green color; after sintering they turned greenish-gray and consolidated but were extremely brittle.

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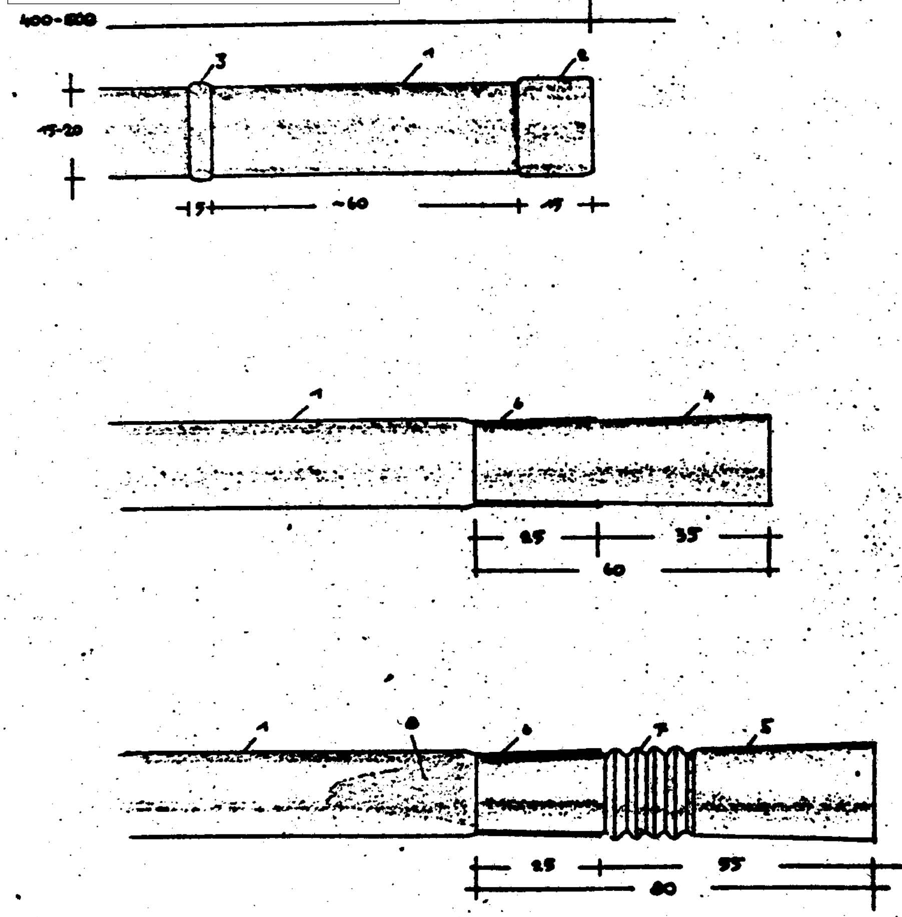

Sketch No. 3
Methods of Stabilizing Tubes

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Methods of stabilizing tubes

Legend:

Natural size

1. diaphragmatic tube, about 45 cm cong, diameter 15-20 mm
2. copper coating for stabilizing the ends of the tube
3. copper rings
4. nickel sheet mouthpiece at one end of the tube
5. elastic mouthpiece at the other end of the tube
6. necked-down portion of the tube caused by the welding process
7. elastic part of the mouthpiece at one end of the tube
8. discolorations due to chemical reactions caused by the welding with heating coils

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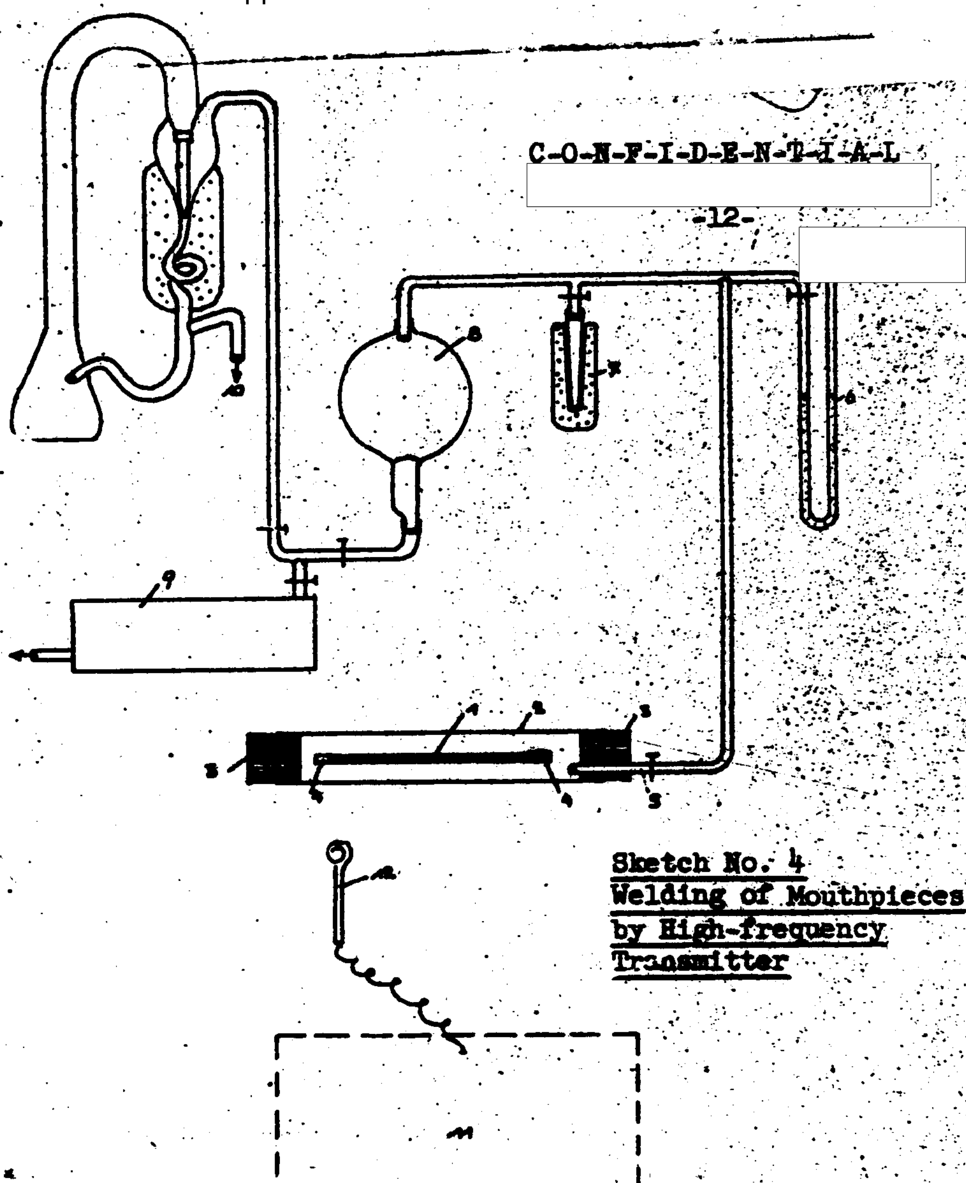

Sketch No. 4
Welding of Mouthpieces
by High-frequency
Transmitter

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Welding Mouthpieces by High-frequency Transmitter

Legend:

Scale 1:10

1. diaphragmatic tube
2. glass tube (vacuum)
3. rubber plug
4. nickel sheet mouthpiece
5. discharge
6. manometer
7. cooling device with a removable jacket filled with liquid air
8. 5-liter glass balloon
9. pumping system for medium vacuum pumping
10. mercury vapor jet pump for high vacuum pumping
11. high-frequency transmitter
12. radiator operated by hand

Procedure: After creating the vacuum, the radiator was approached to the welding spot which bonded after glowing briefly. This procedure was repeated at the second welding spot. Then the diaphragm was removed and the next tube inserted. The changing of the tubes, the pumping and welding took about 15 - 20 minutes.

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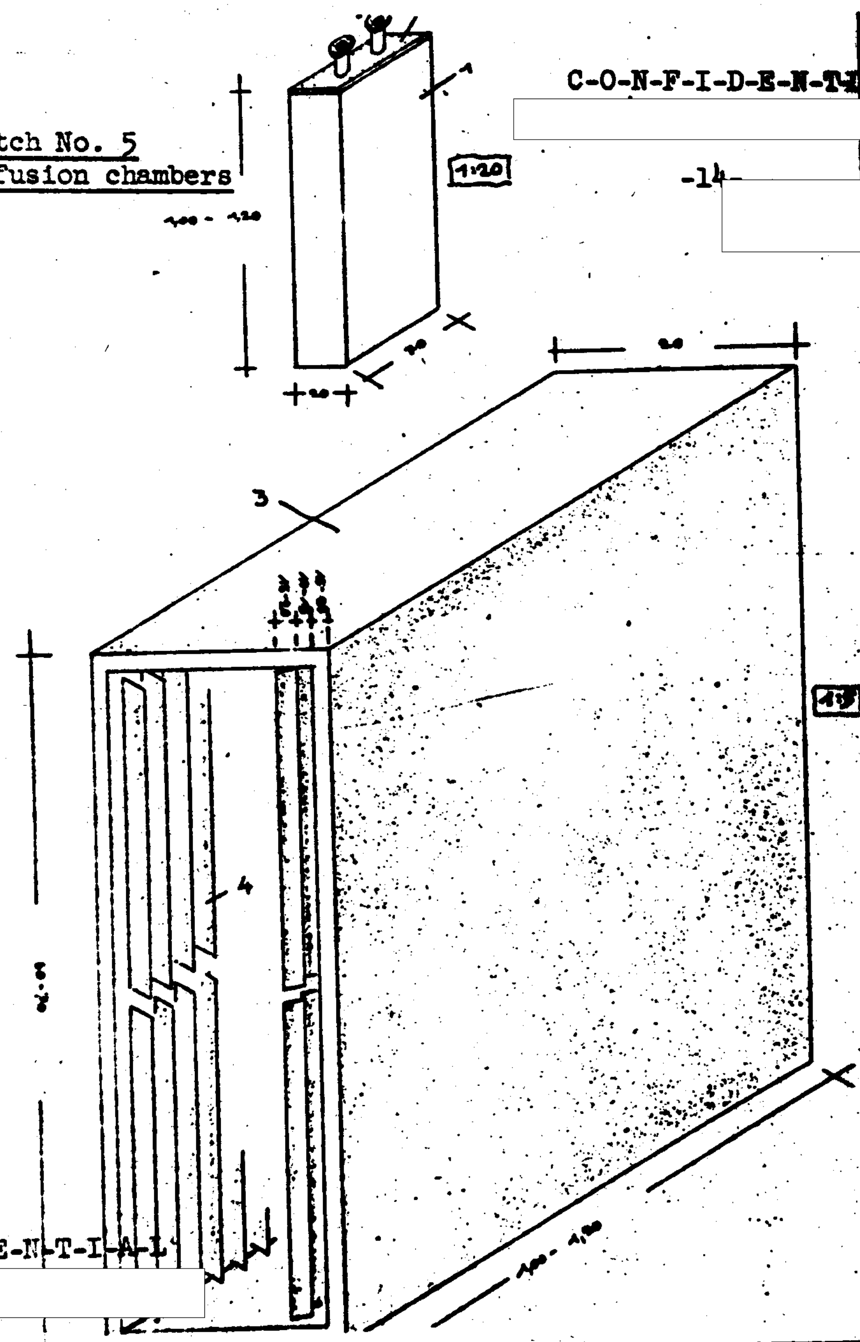
Sketch No. 5
Diffusion chambers



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Diffusion Chambers

Legend:

1. steel box with cleated side walls

2. cover screwed to the box provided with two protruding short tubes

3. steel box, with 15-20 mm thick walls, interior nickel-plated, no cover

4. interconnected laminar sheets, nickel-plated, in oblique position. The space between the two rows is occupied by a tube system. The laminae measured 300 mm in length, 15-20 mm in width; the thickness was undetermined. The distance between the laminae and the wall of the box was about 10-20 mm

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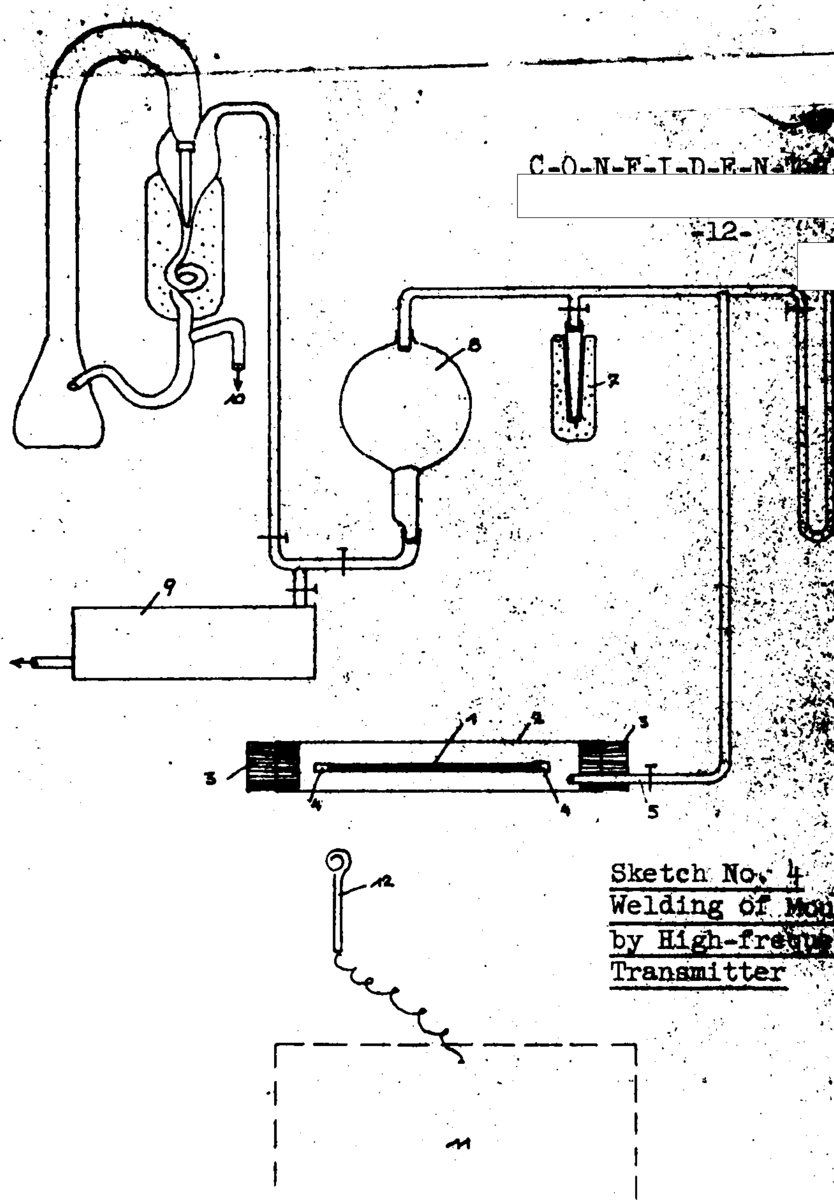

Sketch No. 4
Welding of Mouthpieces
by High-frequency
Transmitter

C-O-N-F-I-D-E-N-T-I-A-L

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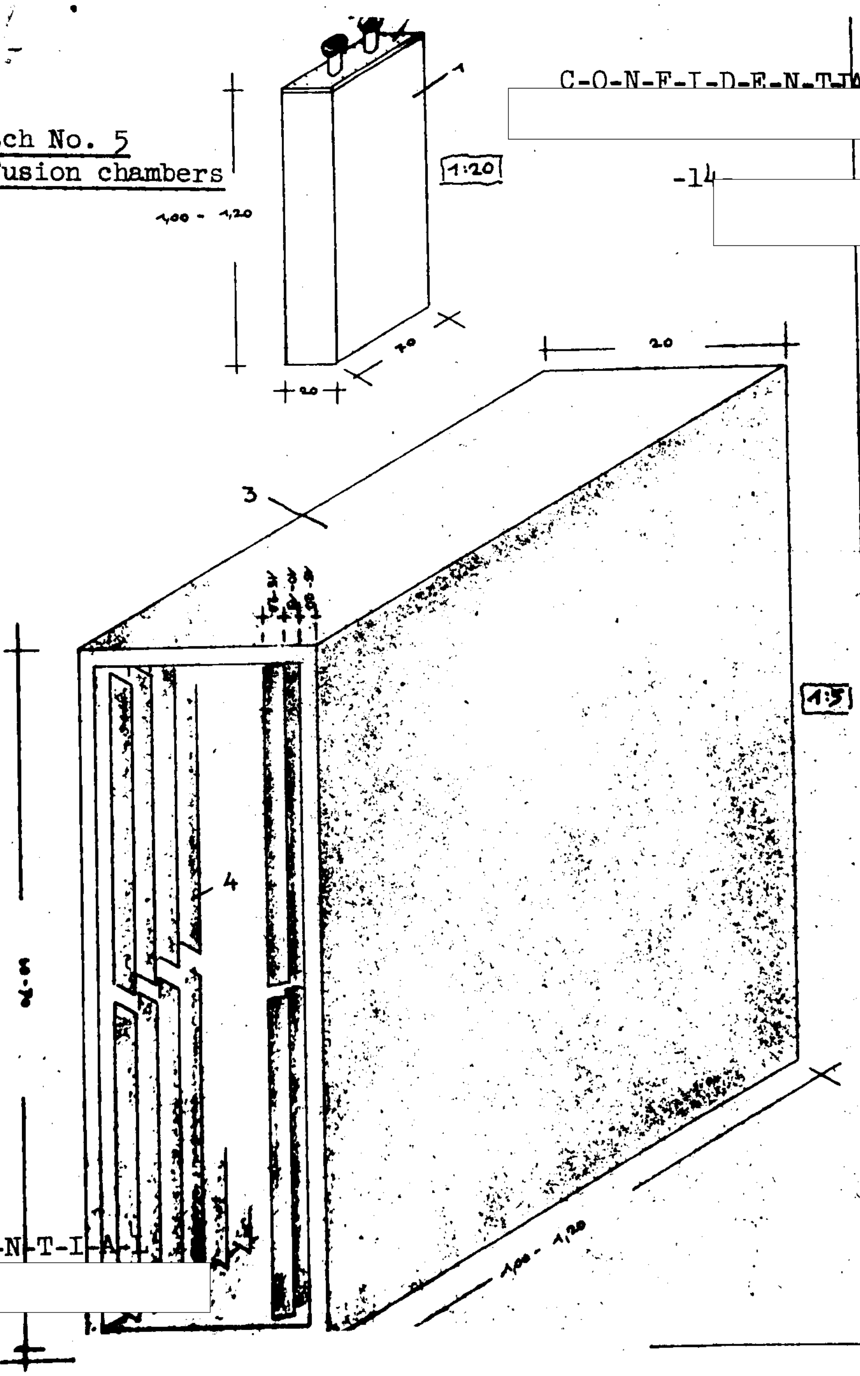
Sketch No. 5
Diffusion chambers



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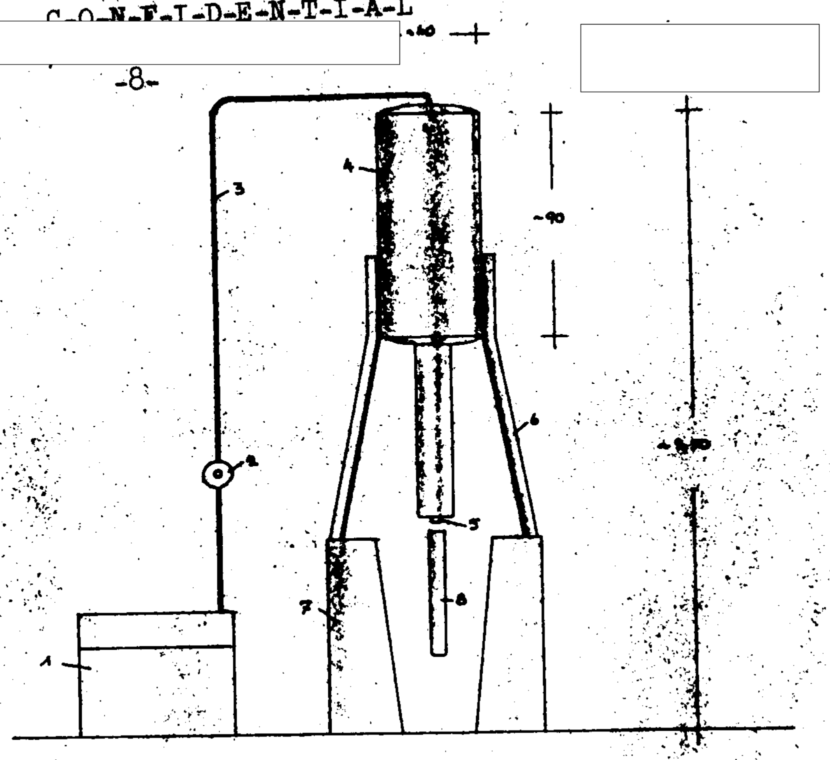

Sketch No. 2
Extrusion press for tubes

C-O-N-F-I-D-E-N-T-I-A-L

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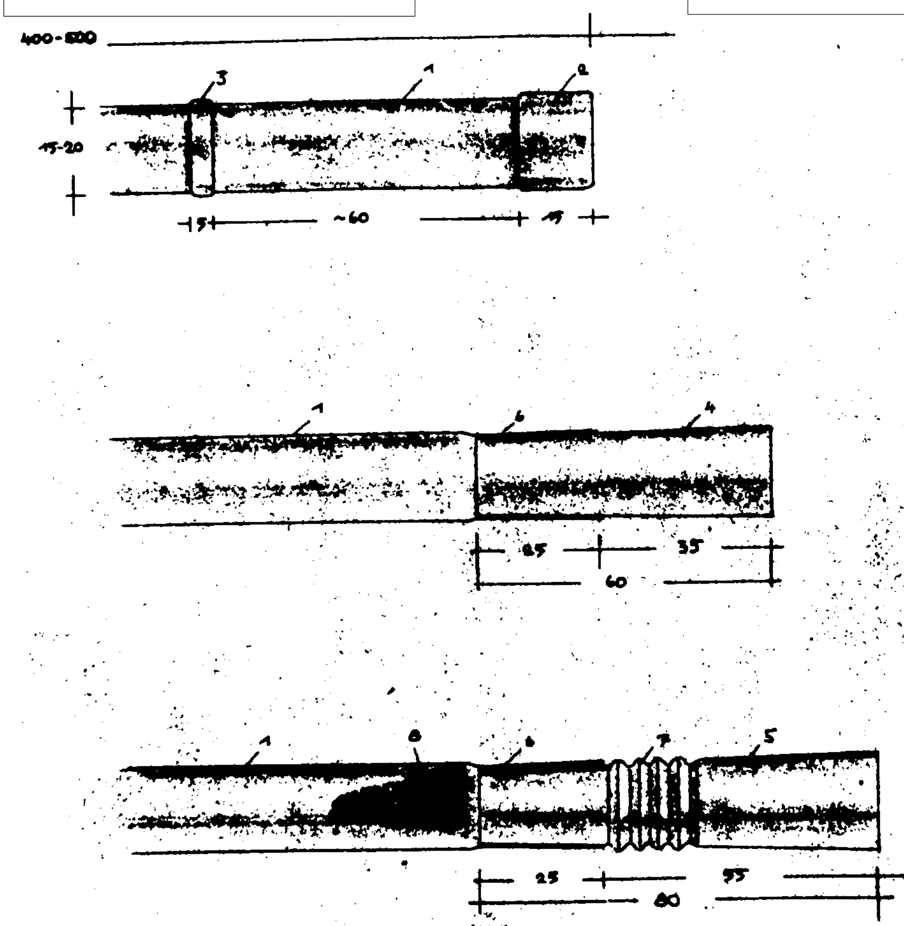

Sketch No. 3
Methods of Stabilizing Tubes

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Sketch No. 1

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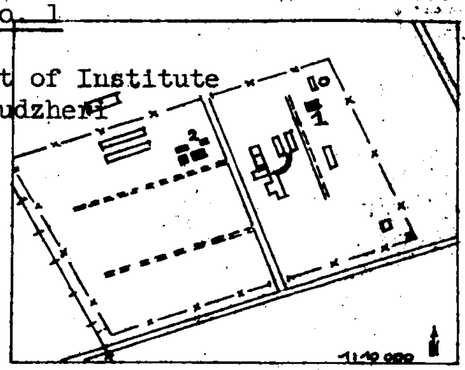
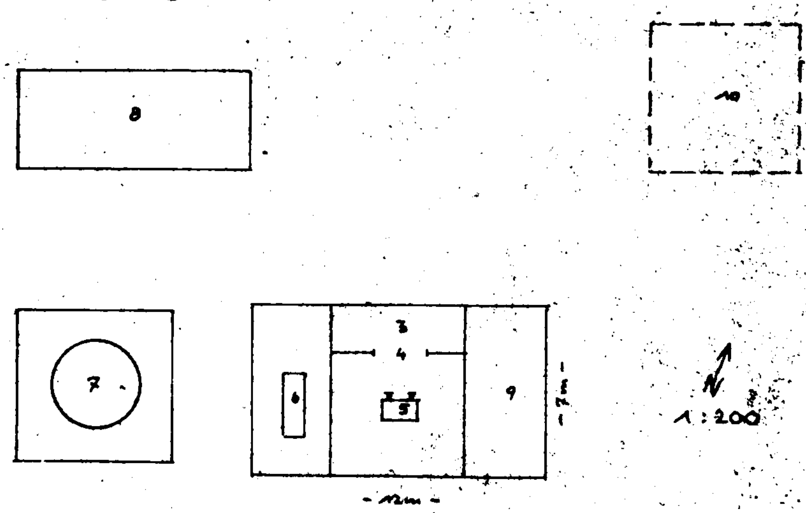
A. Layout of Institute
at Agudzheri



B. Hydrogen Plant at Institute



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